

Functionalization of exfoliated black phosphorus with metal nanoparticles and application of the nanohybrid in catalysis

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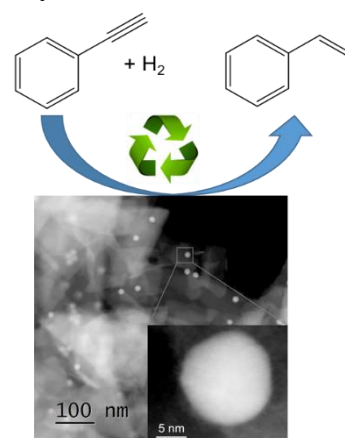
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Black phosphorus (BP) has a layered structure analogue to graphite and recently¹ it was discovered that can be exfoliated down to the monolayer. In this way, a new member of the growing family of 2D materials, named *phosphorene*, the all P-counterpart of graphene, was successfully isolated. Single and few-layer BP (2D BP) have been obtained by several techniques,¹ in our labs good quality phosphorene flakes were prepared by sonicating BP microcrystals in dimethylsulfoxide (DMSO).² Currently, we are exploring its functionalization with transition metal nanoparticles,³ addressing in particular the study with nickel. Morphological analysis carried out by TEM showed nickel nanoparticles are well dispersed on the surface of 2D BP (see figure) and interestingly the nanohybrid Ni/2D BP has an improved stability in ambient conditions in comparison to pristine 2D BP. This feature prompted us to use Ni/2D BP as catalyst in the semihydrogenation of phenylacetylene and afforded good catalytic activity and high selectivity to styrene preserved after recycling tests.



Keywords: black phosphorus, nickel, nanoparticles, 2D materials.

References

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